SEMESTER EXAMINATION, DECEMBER, 2025

Course Name: - B. Tech (CSE) **Semester:- III**

Paper Name: - Data Structures and Algorithms

Paper Code:- NAM 302

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं सह लेखक परीक्षार्थियों के लिए। अधिकतम अंक–70

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory**.
- Section B- Answer any **5 out of 7** given questions. Each question carries **7 marks**.
- Section C- Answer any **2 out of 3** given questions. Each question carries **10 marks**.

Section – A (खण्ड–अ)

Multiple Choice Questions (बहुविकल्पीय प्रश्न)

1. Answer all the following questions. 5x3 =15

i) Which data structure is used for implementing recursion?

a. Stack
b. Queue
c. Linked list
d. Array

ii) Which data structure is needed to convert infix notation to postfix notation?

a. Tree
b. Stack
c. Graph
d. Stack

iii) . What is the value of the postfix expression 6 3 2 4 + – *?

a. -18
b. 99
c. 120
d. 65

iv) Which of the following statement(s) about stack data structure is/are NOT correct?

a. Top of the Stack always contain the new node\
b. Stack is the FIFO data structure
c. Null link is present in the last node at the bottom of the stack
d. Linked List are used for implementing Stacks

v) Which of the following is not a balanced tree

a. B Tree
b. B+ Tree
c. AVL Tree
d. Binary Search Tree

Section – B (खण्ड–ब)

Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions. 5x7=35

a. Write a C program or algorithm to insert a node at first in the single linked list.

Scanned with OKEN Scanner

b. Write a C program or algorithm to insert at the last position of the linked list and discuss the time complexity of it.

c. What is an AVL tree? How it is different from Binary Search Tree? Explain with example.

d. What are the asymptotic notations commonly used? Explain which is more $O(n^2)$ or $O(.5n)$ or $O(n^{1.5})$ with mathematical notations.

e. Write down the algorithms for inserting(Push) and deleting(Pop) from the stack. What are the limitations and usefulness of stack.

f. Write down the Merge Sort and Quick Sort Algorithm and compare between those two.

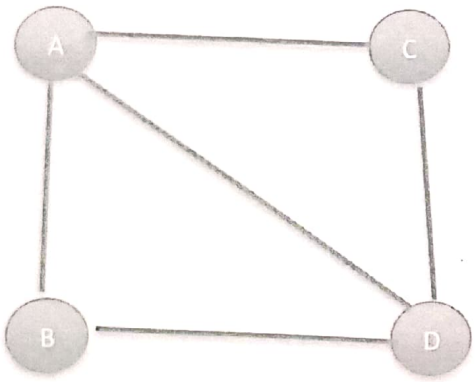
g. Write down the stability of insertion sort and quick sort algorithm. Write down the algorithm of insertion Sort.

Section – C (खण्ड–स)

Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question. 2x10=20

a)



Write down the possible DFS traversal sequences of the above mentioned graph

b) Explain the full heap sort algorithm discussing its specialities.

c) Write postorder traversal of a binary tree with given inorder – 4,2,5,1,3,6 and preorder - 1,2,4,5,3,6. Discuss a sorted inorder binary tree sequence is BST or not.

****

Scanned with OKEN Scanner